

### **WHAT IS CLAIMED IS:**

1. A modified radial motion (MRM) method for modifying lengthwise curvature of face-milling spiral bevel and hypoid gears, which capable of modifying a locus of a cutter center into a curve, without  
5 changing a head cutter's geometry, by providing modified radial motion of the head cutter cooperating with rotation of a cradle.

2.The MRM method as claimed in claim 1, wherein the modified radial motions of the head cutter and rotation angle of the cradle are nonlinear functions of rotation angle of work-gear or rotation  
10 angle of the cradle.

3. The MRM method as claimed in claim 1, wherein the locus of the cutter center can be achieved by a constant radial setting cooperating with modification of a vertical distance  $E_m$  between work-gear-axis  $c-c$  and cradle-axis  $a-a$ .

15 4. The MRM method as claimed in claim 2, wherein the modified radial motion of the head cutter and rotation angle of the cradle are functions of rotation angle of work-gear or rotation angle of the cradle, which can be a high-order polynomial form.

5. The MRM method as claimed in claim 2, wherein coefficient  
20 of the high-order polynomial form of the modified radial motion of the head cutter and rotation angle of the cradle is determined by amount of correction at arbitrary position.

6. The MRM method as claimed in claim 4, wherein the cutter is

adjusted along unit normal of tooth surface of the cutter with an amount of correction after giving an amount of correction at arbitrary position to be corrected, a new position of the cutter center in machine plane can be correspondingly decided, and new positions of the cutter center in machine plane can be correspondingly decided after giving amounts of correction at plural positions to be corrected, with the new positions, the coefficient of the high-order polynomial form of the modified radial motion of the head cutter and rotation angle of the cradle can be determined.

10           7. The MRM method as claimed in claim 1, wherein the modified radial motion of the head cutter can be applied to hypoid and spiral bevel generator with or without tilt head cutter.

          8. The MRM method as claimed in claim 1, wherein the modified radial motion of the head cutter can be applied to holding-type-  
15   orthogonal CNC hypoid and spiral bevel generator.